

CLAIMS

What is claimed is:

- 5 1. A semiconductor device, comprising:
a semiconductor die; and
an inductor including a first bonding wire attached to
a top surface of the semiconductor die and extended
laterally a distance greater than a height of the bonding
10 wire to define an insulating core.
2. The semiconductor device of claim 1, wherein the first
bonding wire has first and second ends respectively attached
to first and second bonding pads on the top surface.
- 15 3. The semiconductor device of claim 2, wherein the first
bonding wire is extended from the first and second bonding
pads to vertically overlie an edge of the top surface.
- 20 4. The semiconductor device of claim 1, wherein the first
bonding wire is formed with a coil that surrounds the
insulating core.
5. The semiconductor device of claim 4, wherein first and
25 second ends of the first bonding wire are attached to first
and second bonding pads, respectively, on the top surface
and the coil is formed with a plurality of turns.
6. The semiconductor device of claim 5, wherein the first
30 bonding wire has an inductance greater than about five
nanohenries.

7. The semiconductor device of claim 1, further comprising a semiconductor package for housing the semiconductor die and the inductor.

5 8. The semiconductor device of claim 7, wherein the first bonding wire is attached to a first bonding pad of the semiconductor die, further comprising a second bonding wire attached between a second bonding pad of the semiconductor die and a lead of the semiconductor package.

10 9. The semiconductor device of claim 7, wherein the semiconductor package includes an encapsulant for providing the insulating core and for maintaining a position of the coil.

15 10. The semiconductor device of claim 1, wherein the first bonding wire provides an inductance and the semiconductor die includes an oscillator operating at a frequency determined by the inductance.

20 11. The semiconductor device of claim 10, wherein the frequency is greater than two gigahertz.

25 12. The semiconductor device of claim 1, wherein the bonding wire has a substantially circular cross-section.

13. A semiconductor device, comprising:
a semiconductor die; and
a bonding wire electrically coupled to the
30 semiconductor die and having a first portion formed in a coil around a dielectric core and a second portion extending vertically from a surface of the semiconductor device.

14. The semiconductor device of claim 13, wherein the bonding wire is attached to first and second bonding points defining a line, and an axis of the dielectric core is substantially parallel to the line.

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15. The semiconductor device of claim 14, wherein the axis is substantially parallel to an edge of the semiconductor die.

10 16. The semiconductor device of claim 13, further comprising a semiconductor package for housing the semiconductor die and the bonding wire and having a lead that provides the surface for attaching the bonding wire.

15 17. A method of operating an integrated circuit, comprising the steps of:

generating a current on a semiconductor die; and

routing the current through a coil of a bonding wire to develop a magnetic flux in a dielectric core.

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18. The method of claim 17, wherein the step of routing includes the step of routing the current over an edge of the semiconductor die.

25 19. The method of claim 17, wherein the step of routing further includes the step of generating the magnetic flux along an axis of the dielectric core that is substantially parallel to a line through the first and second ends of the bonding wire.

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